N° 10,245 A.D. 1902

Date of Application, 3rd May, 1902
Complete Specification Left, 2nd Feb., 1903—Accepted, 5th Mar., 1903

PROVISIONAL SPECIFICATION.

"Improvements in Receivers Suitable for Wireless Telegraphy."

We, Guglielmo Marconi, Electrician, and Marconi's Wireless Telegraph Company, Limited, both of 18 Finch Lane, in the City of London, do hereby declare the nature of this invention to be as follows:—

This invention is based upon the discovery that a core or rod of magnetic material which is not sensibly affected by high frequency electrical oscillations or Hertzian waves under ordinary circumstances becomes sensitive to them when placed in a varying or moving magnetic field.

On a core consisting of some magnetic material which may be iron preferably in a subdivided state such as fine wires or needles is wound one or several layers of insulated copper wire. Over this winding is placed insulating material and over this a secondary winding of thin copper wire. The ends of the winding nearest to the iron core are connected one to earth or to a capacity and the other to an elevated conductor or they may be connected to the secondary of a suitable transformer or intensifying coil such as are now used in connection with wireless telegraph receivers. The ends of the secondary winding are connected to the terminals of a telephone, galvanometer or other suitable receiving instrument. At the ends of the core or outside the coil in close proximity to it is placed a magnet which is so moved as to cause a constant change in the magnetism of the iron core. It is found that if the electrical oscillations of suitable period are transmitted according to the now well known methods rapid changes are effected in the magnetism of the iron core which produce induced currents on the winding and which in their turn reproduce on the telephone or receiving instrument the intelligible signals transmitted from the sending station.

The telephone or receiving instrument may be connected to the ends of the winding nearest the core and the other winding be omitted, or the iron core may be placed in close proximity to a telephone diaphragm and the sudden changes of magnetism in the core can then be detected by sounds produced by the diaphragm. In this case also no second winding is required on the core.

Dated this 3d day of May 1902.

G. MARCONI.
Carpmael & Co.,
Agents.

COMPLETE SPECIFICATION.

"Improvements in Receivers Suitable for Wireless Telegraphy."

We, Guglielmo Marconi, Electrician, and Marconi's Wireless Telegraph Company, Limited, both of 18 Finch Lane, in the City of London, do hereby

[*Price* 8*d*.]

declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention is based upon the discovery that a core or rod of magnetic material which is not sensibly affected by high frequency electrical oscillations or Hertzian waves under ordinary circumstances becomes sensitive to them when placed in a varying or moving magnetic field.

On a core consisting of some magnetic material which may be iron, preferably in a sub-divided state, such as fine wires or needles, is wound one or several layers of insulated copper wire. Over this winding is placed insulating material and over this a secondary winding of thin copper wire contained in a narrow bobbin.

The ends of the winding nearest to the iron core are connected one to earth or to a capacity and the other to an elevated conductor, or they may be connected to the secondary of a suitable transformer or intensifying coil. The ends of the secondary winding are connected to the terminals of a telephone or other suitable receiving instrument.

At the ends of the core or in close proximity to it is placed a magnet which is so moved or revolved as to cause a constant change or successive reversals in the magnetisation of the iron core.

It is found that if the electrical oscillations of suitable period are sent from the transmitting station according to the now well known methods rapid changes are effected in the magnetisation of the iron core, which changes produce induced currents on the winding and these currents in their turn reproduce on the telephone or receiving instrument the intellible signals sent from the transmitting station.

Another successful method is to keep the magnet fixed and use an endless iron rope or core of thin wires revolving on pulleys through the windings (which in this case are separated from the iron by means of a thin glass tube to prevent chafing of the wires) in proximity to a magnet or magnets.

Figures 1 and 2 are diagrammatic front and side elevations of the arrangement. Figures 3 and 4 are similar views of a modification.

a is the core the ends of which in Figures 1 and 2 are bent upwards and consisting of about 100 hard-drawn iron wires of about .2 m.m. in diameter. Over this a primary winding of one or two layers of thin silk covered wire *b* is placed one end being connected to a capacity E which may be the earth and the other to the aerial conductor A. The wire of the secondary winding *c* is about .02 c.m. in diameter and a sufficient number of turns of it is used to give a resistance about equal to that of the telephone T to which its ends are connected.

d is a horseshoe magnet driven round by a preferably silent clockwork mechanism at a speed of about one revolution per second.

Figures 3 and 4 show the arrangement where a continuous band or metal rope is used.

In this case two stationary horseshoe magnets *d d* are used which should be arranged with their like poles together. The core *a* is flexible and passes around two pulleys *e* which are about 10 c.m. in diameter and are placed about 20 c.m. apart. They are driven by clockwork at about the speed of one revolution every twenty seconds. *g* is a glass tube on which the primary *b* is wound and through which the core *a* passes. The other parts are similar to those of the former arrangement.

Either iron or steel can be used for the cores or revolving rope, but best results have been obtained when using hard drawn iron wire or iron wire which has been considerably stretched and twisted beyond its limits of elasticity prior to being employed. We have usually employed wires each covered with one coating of silk insulation.

The telephone or receiving instrument T may be connected to the ends of the winding *b* nearest the iron and the other winding *c* be omitted, or the iron core *a* may be placed in close proximity to a telephone diaphragm and the sudden changes of magnetism in the core can then be detected by sounds produced by the diaphragm. In this case also no second winding is required on the core.

In place of a moving magnet or band an alternating current of low periodicity made to pass through one of the circuits may be used to produce the necessary varying magnetic field; or if a moving band is used a continuous current may be used to produce the magnetic field.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is:—

1. In receivers for wireless telegraphy the combination of a core or rod of magnetic material and a varying or moving magnetic field for the purposes described.

2. In receivers suitable for wireless telegraphy the combination of a core or rod of magnetic material in a varying or moving magnetic field and a coil surrounding the rod or core through which the received oscillations are caused to pass.

3. In receivers suitable for wireless telegraphy the combination of a core or rod of magnetic material in a varying or moving magnetic field, a coil surrounding the rod or core through which the received oscillations are caused to pass and a second coil likewise surrounding the rod or core and having its ends connected to a telephone or other suitable receiving instrument.

4. In receivers suitable for wireless telegraphy, the combination of a stationary magnet, a travelling metallic band in the magnetic field, and a coil in proximity to the band, substantially as described.

5. Receivers suitable for wireless telegraphy substantially as described and illustrated in the drawings.

Dated this 2nd day of February 1903.

CARPMAEL & Co.,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1903.

ERRATA.

SPECIFICATION No. 10,245. (4th Edition.) A.D. 1902.

Page 1, line 24, *for* "conected" *read* "connected."
,, 2, ,, 8, *after* "iron" *insert* comma.
,, 2, ,, 9, *after* "state" and "needles" *insert* commas.
,, 2, ,, 39, *before* "telephone" *insert* "the."

PATENT OFFICE,
9th Nov., 1910.

A.D. 1903, May 3. No 10,245.

MARCONI & others' Complete Specification.

(1 sheet)

Fig. 1.

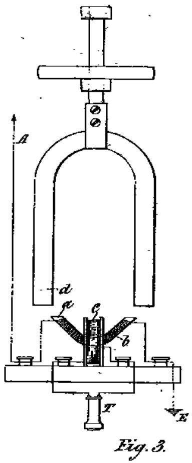

Fig. 2.

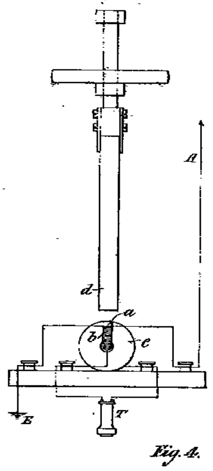

Fig. 3.

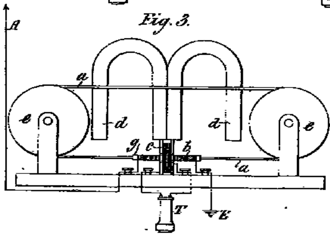

Fig. 4.

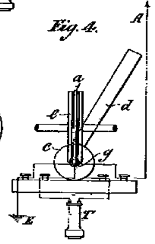

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Fig. 1.

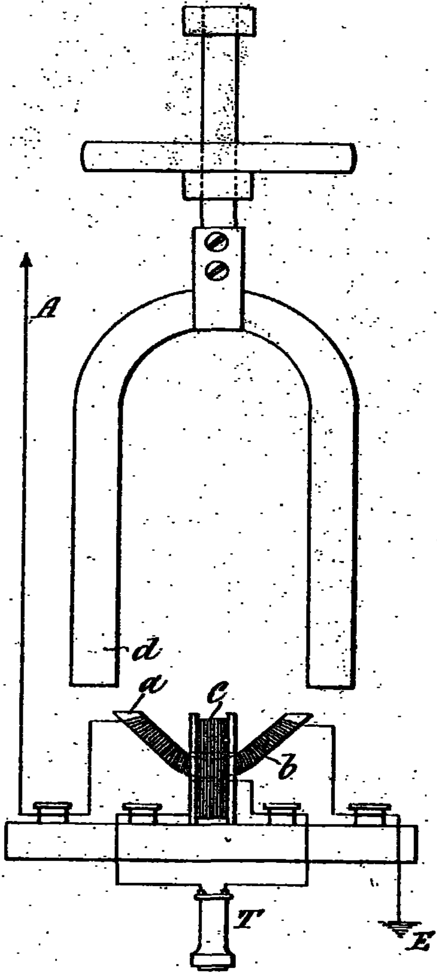


Fig. 2

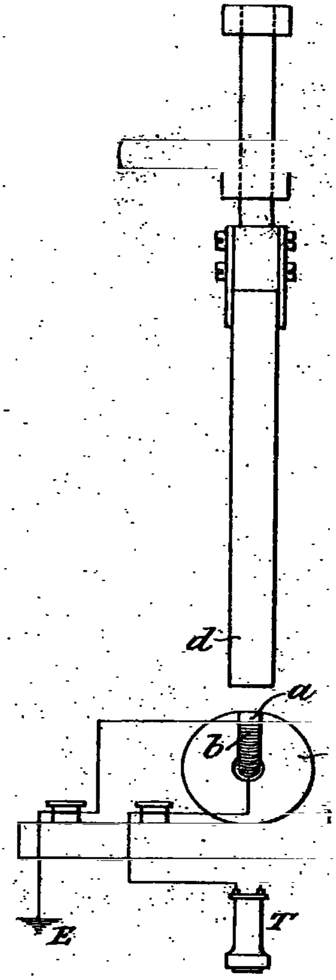
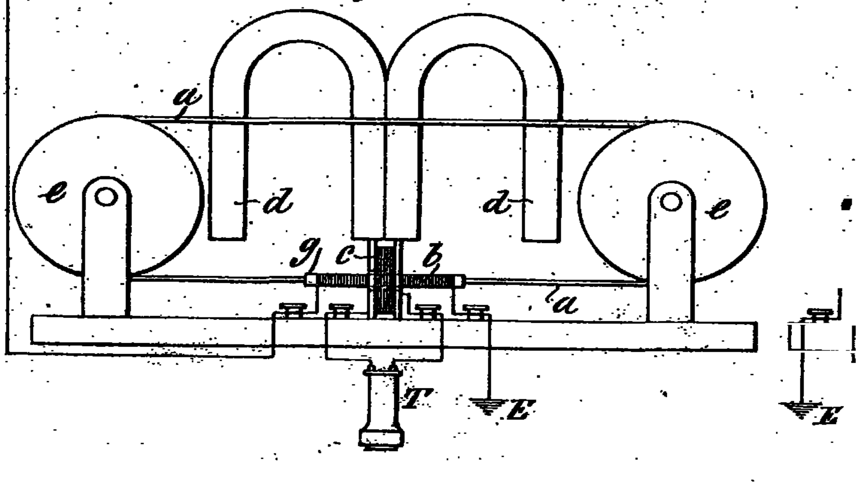


Fig. 3.



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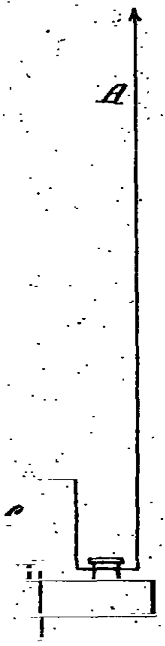
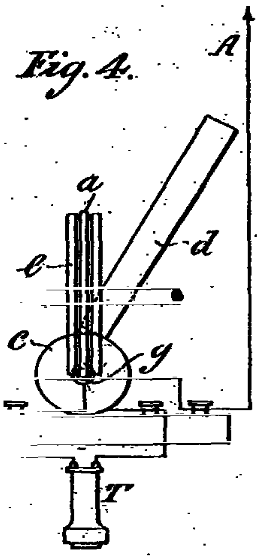


Fig. 4.



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